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APPENDIX

TO THE

PAPERS ON THE NERVES,

REPUBLISHED

FROM THE ROYAL SOCIETY'S TRANSACTIONS,

BY

CHARLES BELL;

CONTAINING

CONSULTATIONS AND CASES

ILLUSTRATIVE OF THE FACTS ANNOUNCED IN THOSE PAPERS.

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# CONSULTATIONS AND CASES

ILLUSTRATIVE OF

## THE FACTS

ANNOUNCED IN THE PRECEDING PAPERS.

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THESE sheets contain notes of practice and letters of consultation received since the republication of the papers upon the nerves, from the Philosophical Transactions.

They confirm and illustrate the opinions delivered in those papers, and show that the symptoms of diseases, and the phenomena of the living body, of the most common occurrence, escape observation, if they are

witnessed in ignorance of their cause; and that anatomy properly cultivated, gives precision to our notions and consequently distinctness to the symptoms of disease.

If the reader, in prosecuting this subject, turns to the perusal of the systematic authors\* on the disorders of the nerves, he will see that there is great confusion. Nominal varieties are made of diseases where there is no real distinction; and diseases of a totally different nature are classed together. How could it be otherwise; how was it possible that the diseases of the different classes of nerves could be distinguished by observation merely, when those nerves appeared to the anatomist confused as an unravelled skein of threads; and when whole systems of nerves, differing essentially from each

\* See Sauvages, Cullen, and others.

other, were supposed to be branches from the same root?

It was not my intention to write on this part of practice, but the reader will see how the subject has grown upon me. The papers, as originally composed for the Royal Society, were not the proper channels for these practical illustrations; and, therefore, it is better that they should be published thus separately for the perusal of the profession.

I shall be happy if these few pages should aid in what has been the object of the more active part of my life—to exhibit the importance of anatomy, and to show that no ingenuity exercised for the occasion merely, will enable the practitioner to investigate disease, or supply the defect of an ill-directed anatomical education.



I could not introduce certain communications without giving pain; and, therefore, I have altogether omitted some cases, which would have put the subject in the most interesting light.

I have added a plate of the nerves of respiration, in the hope, that when the reader sees how distinct and peculiar they are in their origin and course, and when he compares the anatomy, as there exhibited, with the facts narrated in the few last pages of this Appendix, he may have no difficulty in comprehending the subject; and that, being as familiar with the respiratory nerves of the trunk as with those of the face, he may comprehend as easily the nervous affections of the trunk as the nervous affections of the face.

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The first division of cases will illustrate my first paper, in which I have demonstrated, that the branches of the fifth pair of nerves give sensibility to the head and face ; and that the motions of the eyelids, cheeks, nostrils, and lips, result from the influence of the *Portio dura* of the seventh nerve.

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PARALYTIC AFFECTION OF THE FACE.\*

In consultation the following letter was put into my hands :

I. “ It is in my power to relieve your mind of much anxiety. My experience has furnished me with five cases of paralysis of

\* To know the previous state of opinions, and the point from whence we start, read a paper on this subject, Transactions of the College of Physicians, vol. i.

the muscles of the face of one side, and completely local, and in no way connected with the *encephalon*. They all did well without general bleeding. Dr. B. and Dr. S. met me lately in consultation on the case of a lady in the eighth month of her pregnancy, who suffered this partial paralysis of the muscles on one side of her face, from the action of mercury on her mouth. The sore mouth inflaming, a lymphatic gland between the mastoid process and the angle of the jaw compressed a branch of the seventh pair of nerves. The muscles of the face on that side were so completely paralysed, that the cheek was drawn by their antagonists, and the mouth disfigured.

“ Dr. B. and Dr. S. suspected pressure on the brain at the origin of the fifth pair of nerves. But I took the liberty of stating



the discoveries of Mr. Charles Bell, and proved to them by other cases which had fallen under my notice, that there was no danger, and that the brain was not implicated.

“ This case, in the course of a fortnight, did well under the use of mild laxatives, leeches behind the ears, and a small blister.” \*

I owe the following case to the kindness of Dr. Gregory, who has vouched for the accuracy with which the account of symptoms has been drawn up by a medical

\* *Trismus diastrophe. Diastrophe Galeni. Oris tortura paralytica Linnæi.* Est distorsio oris versus alterutrum latus, ob oppositi lateris hemiplegiam, unde musculus zygomaticus et buccinator lateris sani os ad se trahunt et tractum detinent, paralyseos aut apoplexiæ prodromus aut sequela: eandem curam expostulans. — *Sauvages.*

friend. The patient is now under Dr. Gregory's care.

*Case of Paralysis of the Face.*

II. " John Chapman, æt. 45, foreman to a builder, January, 1827. He says, for five years past he has not considered himself in a good state of health. Three years ago, after a few days' illness, he was seized with paralysis of his lower extremities : he recovered from this attack, and resumed his occupations. He had an abscess in his right ear, which burst, and continued to discharge matter : he cannot precisely state when the disease of his ear commenced. For eighteen months following the attack of paraplegia, he was subject to fits of the ague ; afterwards he was free from any complaint, except that his ear discharged a

thin foetid matter. In August last, while coughing or sneezing, a substance which he describes as cylindrical and hollow, about an inch in length, dropped from his right ear : from this time the discharge ceased. Three weeks after this period, his wife first observed that his face was distorted to one side. On presenting himself to his medical attendant in the country, he was told that he was going to have another attack of palsy, and was ordered to be cupped and blistered, &c. His daughter says, his countenance appears now exactly in the same condition as when first observed to be distorted.

“ All the muscles of the right side of his face, which are controlled by the influence of the portio dura, or respiratory nerve of the face, are completely paralysed. He cannot elevate his eyebrow nor frown ;

there is a line nearly in the centre of his forehead, dividing the bulging of the muscles on the left side from the smooth uncontracted state of those on the right side. He cannot close the eyelids of the right eye ; they remain always open : when he makes the attempt to close them, we see the eyeball rolling upwards. The secretion of tears is very abundant, so as to render this eye more glistening than the other : he complains of the inconvenience produced by its continually weeping ; he also attributes a dimness of vision in the right eye to this cause. From the nature of his occupations, he is constantly troubled by the dust getting into this eye ; but he has acquired a readiness of pulling down the eyelid with his finger, to defend it. His daughter says, that when she has seen him asleep, only the white of his eye was visible.



“ His right nostril is collapsed. The muscles of the cheek and mouth are relaxed and dragged to the left side. When he speaks, the cheek flaps like a blind before an open window, and if he attempt to utter a word with peculiar emphasis, the air escapes from the corner of his mouth, like the whiff of a person smoking. He sometimes experiences a difficulty of swallowing, at the moment when the morsel is thrown back into the fauces.

“ The sensibility of the right side of his face is natural. When he clenches his jaws, the masseter muscles can be felt equally hard and contracted on both sides of his face. He can protrude his tongue, and twist it to either side. He is deaf in the right ear.”

The peculiarity of the preceding case is paralysis occurring in two instances in the

same patient, but from different causes. It was natural for the physician in the country, on perceiving paralysis come upon the face, to suppose it was the precursor of a second attack of paraplegia. But comparing the symptoms with those of other cases in this Appendix, and more especially observing the connection betwixt the discharge from the ear and the paralysis of the face, the reader will be inclined to believe with me that the second attack arose from the affection of the portio dura in its course through the temporal bone.

“ SIR,

III. “ Having attended your brother’s lectures during my studies in Edinburgh, and read several of the works of both, I am induced to apply to you in behalf of a very respectable patient, Mr. —— of this place. He is a healthy strong man

of 50, who has been affected for nearly 20 years with an involuntary contraction of the muscles of the side of his face, drawing up the angle of the mouth, and giving to the palpebræ a winking motion, so remarkable, that it may be seen at a considerable distance. This hurts his feelings so much, that he has lately come to the determination of having an operation performed on the nerves of the part affected.

“ He has never had any pain during the convulsive actions but once for two or three days, when it was so severe as to resemble, in many symptoms, the *tic douloureux*. I am ignorant that the operation has been ever performed for such an affection. But as the disease has become much more troublesome, I should think there would be no impropriety in trying it.

“ Should you be enabled to give any encouragement to its performance, he will proceed to London immediately.”

I have, in p. 178. stated that a gentleman came to me to have the branches of the fifth nerve, on one side of the face, cut, in order to balance the paralytic features. A singular consequence would have resulted from such an operation. The patient would have been deprived of sensibility on one side of his face, and of motion on the other !

If the subject of the present consultation had submitted to have the nerve cut, his eye would have remained open, for the *attollens palpebræ* being supplied by the third nerve, and the *orbicularis palpebrarum* by the seventh, the cutting of the latter would have paralysed the eyelids : they would



have remained open, and the eye would have become inflamed, and probably opaque. There would have been greater deformity, and blindness to boot.

How such proposals come to be made is obvious enough. Surgeons have been, of late years, cutting the branches of the fifth pair with impunity ; that is to say, no ugly paralysis resulted from these operations.

There was a talk of a *tic* in the *portio dura* ; but if the nerve was cut, the profession has not heard the result of it ; the most distressing consequences must have followed such an operation. See p. 179.

Answer to the foregoing letter.

34. Soho Square, May 16.

“ DEAR SIR,

“ I am happy you have communicated this case of Mr. G. to me, for some serious considerations present themselves, before attempting to remedy his symptoms by an operation. The nerve affected is the portio dura of the seventh pair, which comes out before the ear, and spreads from that over the face. It is very liable to the affections which you describe. But before dividing it we must consider its functions, which are very important : through it, we are enabled to close the eyelids, and through it we move the lips in speaking. Although we leave the branches of the fifth pair going to these parts, yet by the division of this portio dura of the seventh pair, we deprive them of all motion. The effect upon the

eye is very serious : it remains open, and the exposure excites inflammation and opacity.

“ These you will see are strong reasons against cutting across the nerve. Perhaps you are not aware that the dividing of this portio dura would not at all diminish the pain, the sensibility of the side of the face depending altogether upon the fifth pair. I fear, therefore, you must limit your attempts to relieve your patient, to medical treatment. You will find this twitching to depend a good deal on the state of the digestion. Anodyne liniments rubbed in the course of the nerve, and pressure to limit the motion of the parts spasmodically affected, I have found attended with advantage. The pressure, which restrains this spasmodic motion, tends to break that habit, on which, in a great measure, it at length

depends, however originally produced : and indeed it is this circumstance, the continuance of the symptoms for twenty years, which forbids me being sanguine in the expectation of your effecting a cure.

(Signed)      “ CHARLES BELL.”

*Paralysis of the Face.*

“ MY DEAR SIR,

IV. “ Being informed by Mr. Alexander Shaw, that you were desirous of having some notes which I had taken of partial paralysis of the face, I beg leave to transmit them to you.

“ S. Nicholas, æt. 35., a sailor. — He has been ill for upwards of three years, with various scrofulous affections. Two years ago, he first noticed that he was deaf in his left ear. Subsequently there



has been a discharge from it. About nine months ago, abscesses formed in various parts of his body, one of which broke just betwixt the mastoid process and the angle of the jaw of the left side. The cicatrix is still painful to the touch. Shortly after the formation of the abscess, it was remarked that the left side of the face was paralysed, and the eyelids of the same side stood open, and could not be closed by any mental effort directed immediately to them. \*

“ He says that a portion of that side, viz. the fleshy part of the cheek, feels puffy, although he adds, he is conscious that this is not really the case. The left ala nasi is also paralysed, for if he lies on the right

\* It may be worth remarking, that Nicholas always keeps the lids of the left eye closed by his hand, to keep it warm, as he says.

side with his head pressed against the pillow, he is obliged to pull the left nostril open with his fingers in order to breathe freely.

“ He also says, that he feels as if he had no power to hold any thing with the *sound* side of his mouth. It is certain that he always applies the mug, in drinking, to the paralysed side.

“ He can chew equally well on both sides. And the sensation of touch is equally acute in all parts of his face.” The eyeball of the left or paralysed side is also sensible to touch and to other stimuli. The motions of the eyeball were examined by Mr. North of Seymour Street, by Dr. Stewart, Mr. Griffiths, and by myself, and it was evident to all of us, that whenever the patient attempts to close his eyes, the

left eyeball is turned up. When the right eyeball was examined by forcibly separating the lids of that side, it was always found in the same position as the left.

“ I remain, dear Sir,

“ Your obliged,

“ R. FERGUSON.

“ Feb. 21. 1825.

5. Baker Street, Portman Square.”

We have, in the foregoing letter, a simple and very clear statement of a common case. For the case is very common, although the observers are not always masters of the subject like Dr. Ferguson.

The *rationale* is obvious enough. The *portio dura* is involved in the stool of an abscess ; and it has partaken of the inflammation. Just as the spinal marrow being involved in the inflammation of the diseased vertebral column will cause paralysis of the

lower extremities, so here the muscles of the face corresponding with the portio dura lose their power.

The reader will observe, that the patient “*can chew equally well on both sides.*” I have noticed such circumstances before, that although the individual could not hold his pipe with the lips, he could turn the morsel, which led me to reflect on the muscular branches of the fifth pair sent to the buccinator muscle. See *the last paper, on the Nervous Circle* \*, and *System of Anatomy*, vol. ii. p. 518.

### *Motion of the Eye.*

In the preceding letter, as well as in several which follow, notice is taken of the

\* See the Philosophical Transactions.



rolling of the eyeball. I have explained at p. 293. the necessity of a connection betwixt the motion of the eyelids and the motions of the eyeball itself; and I have shown that the connection betwixt the muscles of the eyelids and eyeball is established at the roots of the seventh and fourth nerves. I may be permitted to express my surprise that there can be any doubt upon this subject: it is so easy to prove that when the eyelids close, the eyeball rolls up.

In reference to the last letter, it is distinctly stated, that when the eyelid stood open from paralysis, the eyeball turned up at every effort to close the eyes. Systematic authors call this want of power to close the eyelid, *Strabismus lagophthalmos*; *Vue de lièvre*, from the vulgar notion that the hare sleeps with her eyes open.

Sauvages says, that this affection is class-  
ed with strabismus ; but on what principle,  
he adds, authors have failed to inform us.  
I believe it is owing to their seeing the  
eyeball turned up, which they conceive to  
be part of the disease ; but this is a natural  
action, which, from the eyelids being apart,  
is seen so as to appear like a symptom of  
disease.

On every occasion where the immo-  
bility of the eyelids has given me the op-  
portunity of observing the motions of the  
eyeball, it has rolled upwards, as I have  
described, p. 294. during the effort to close  
the eye. I have many times pointed out  
the circumstance to the pupils going round  
the Hospital.

Dr. Brewster, in his Journal, denies that  
the eyeball revolves. I am sorry that I

must speak of that person. The passage in p. 323., where I have given a preference to the authority of Dr. Young, is, I conceive, the source of all the unbecoming violence in the two papers of Dr. Brewster. My reader must perceive the object of the paper, p. 289. to be, *first*, to show the different motions of the eyeballs and eyelids, and to deduce from that examination the necessity of two classes of muscles. *Secondly*, to show that the muscles are divided into two classes; that to the motions of the one we are acutely sensible, while to the operations of the other we are totally insensible; and hence to prove that there must be nerves with distinct endowments. *Thirdly*, it is shown, that owing to the different sensibilities enjoyed by the organ, and the distinct classes of muscles, there is a necessity for the six nerves which go to the eyeball and eyelids, which is the final

object of the paper. A reader of Dr. Brewster's Journal could not guess at the contents of this paper. He thinks he will mortify me by representing me as an oculist, seeking notoriety, but in danger of blinding people by improper operations. My answer is simply this, that he has conducted this piece of criticism in a manner highly improper in one countenanced by the Royal Society of Edinburgh as their officer.

*Case, &c.*

V. " Mary Unwin, now in her 22d year of age, is about seven months advanced in her second pregnancy : she is of a full habit of body, and instead of having the usual wasting of the face and sharpness of features, she has a plumpness and fulness. She has for some time complained of spasms of the lower extremities. Her constipated state



of bowels has required powerful purgatives to relieve her. The head has not been the seat of any particular affection, though, when the enquiry was repeated, she observed that there had for some time existed a dulness over the eyes. — She applied for advice respecting a remarkable affection of the face, on the 5th of February. On examining the countenance, a singular distortion of the features is most apparent. The mouth is drawn to the right side, and the nose evidently inclines in the same direction. She was asked to put the forehead in action as in frowning, and then was presented the appearance of wrinkles across the right side of the forehead, whilst the opposite side was even and perfectly unmoved. In sleep, the right eyelids are closed as usual, but the left eye remains uncovered. She appears to have no power over the muscles, whose office it is to move the eyelids of the left side.

“ There is little (I think no) difference in the sensibility of the two sides of the face. There is occasionally a dimness of vision of the left side, owing probably to the circumstance of the globe of the eye not being lubricated with the tears, as is the case with the opposite one.

“ The patient states that she experiences pain on the left side of her neck, and at the root of the ear of that side ; but there is no swelling nor marked evidence of inflammation existing in these parts. On pressing on the branch of the *portio dura*, or, as you have termed it, the respiratory nerve of the face, especially in the situation of the parotid gland, no uneasiness is experienced. The iris moves in obedience to the stimuli of light, and the tongue possesses its natural movement. In fact, there is no paralysis in any part of the body, excepting in those

parts specified above, and which are supplied with nervous influence by the *portio dura*.

“ I have been guided in the treatment of this case by the improvement which your important discoveries has effected in the pathology of partial paralysis. Instead of fearing the supervention of pressure on the brain, I considered the affection as confined entirely to an individual nerve. Formerly, excessive depletion would have been resorted to here: I have adopted moderate evacuation, with local stimuli, &c.”

This case was sent, with a very polite note, from Mr. Jackson, of Sheffield. I wrote to him, and this is his answer:—

“ Sheffield, April 23. 1825.

“ DEAR SIR,

“ Considerable delay has been occasioned in my replying to your queries respecting the motions of the eyeball in the case of partial paralysis of the face, which I had the honour of communicating to you. When the patient attempts to close the eyelids, the upper lid of the right eye obeys the will, whilst the upper lid of the left side remains motionless ; and at the same time the left eyeball rolls upwards, so as nearly (sometimes entirely) to conceal the cornea.

“ During sleep, the eyes are similarly circumstanced. The right is closed, and the upper eyelid on the left side remains as in the state of ordinary vision, whilst the inferior margin only of the cornea is



visible ; then simulating the appearance, on the paralytic side, of a person in the act of dying.

“ During the violent respiratory efforts of labour, the expression and action of the muscles on the left side of the face were lost ; in consequence of which, the countenance assumed a singularly ludicrous aspect. I am sorry to add, there appears very little improvement in the state of the patient.

“ It affords me great pleasure in having contributed to establish, by a rare and important pathological fact, the truth of some part of your discoveries as connected with the physiology of the nervous system.

“ I remain,

“ Yours very truly,

“ WM. JACKSON.”

The manner of this letter must convince my reader how well Mr. Jackson is capable of observing minutely. What I drew from the anatomy is here distinctly stated—that, in sleep, the eyeball is given to that state of perfect rest where the voluntary muscles are relieved from activity, and the involuntary muscles balanced, and that in this condition the eye is withdrawn from the light.

The agony, that is to say, the seeming agony, of dying, is very naturally touched upon. We cannot visit the sick without witnessing the influence of the obliqui on the expression of the eyes. (See p. 325.) It is the *Strabismus patheticus*; *orantium* of Boerhaave. Sauvages says, that the eye is turned up towards the close of formidable diseases; “(*Strabismus*) *paulo ante mortem supervenit.*” The vulgar say, that children

with water in the head are looking to their final home, “ *Vulgo aiunt hos tenellos suam patriam respicere :*” and on this he adds, wherefore is the superior elevator muscle of the eye convulsed alone, so that the white of the eye only is visible? It passes my understanding: “ *ratio me latet.*”

It would indeed be strange, if one muscle of a class were thus exerted ; but it is not so. The rectus superior is not convulsed ; for we have seen, that when that muscle was cut, the eyeball still turned up, on irritation by the influence of the obliqui, and that the progress of debility over the voluntary muscles of the eye, as over the other muscles of volition, leaves the obliqui with a relatively greater power, and that it is their operation which distorts the eyeballs.

VI. *Case of Paralysis of the Voluntary Muscles  
of the Eyeball.*

“ Nov. 24. 1825.

“ The master of a small trading vessel applied for advice. The most prominent and obvious symptom of the case was *Ptosis*, or paralysis of the upper eyelid. Suspecting that there might be a general affection of the third nerve, or motor nerve, I desired him to look to the ground: he attempted it, but was utterly unable to accomplish his intention. He was also told to look upwards, and then inwards; in both which he failed.

“ He could close and wink with the eyelids when we touched the cilia, proving that the *portio dura*, and the branches of the fifth, possessed their sensibility and power.\*

\* See page 9. of the last paper, On the Nervous Circle, in the Philosophical Transactions.



“ Now, forcibly separating the eyelids, and desiring him to close them, while I still held them open, I could distinctly see the eyeball turn upwards, which I supposed to indicate that the fourth nerve still influenced the trochlearis muscle.

“ He had the power of looking outwards, accomplished by the sixth, which was not included in the paralytic affection. He saw well, save that the fallen lid interfered with vision. He had been troubled with this affection nearly a fortnight, attended with slight head-ache, and some symptoms of derangement of the stomach and bowels.

“ SAMUEL JOHN STRATFORD.”

*Ptosis* is the term applied by surgical writers to the relaxed eyelid, when the person cannot raise the eyelid so as to disclose the pupil. We have here nothing to do



with those cases, where the inability depends on disease in the eyelid itself: but it must be acknowledged, that the subject of paralysis of the eyelid was obscure until these observations were made. We perceive that this ingenious gentleman, when he found that the patient could not raise his upper eyelid, reflected that this must be from paralysis of the levator palpebræ superioris; that the defect must in all probability be in the third nerve; that if so, the motions of the recti, with the exception of the abducens, must also be imperfect. He found this to be the case. He then reflected that the instinctive turning up of the eyeball depended on other muscles and on other nerves. He knew that when I had cut the voluntary muscle, the *rectus superior*, although the creature could not turn his eye to objects above, yet, that the instinctive motion of the eyeball upwards by the

*obliqui* remained. He tried, and found that the involuntary turning motion of the eyeball was here entire.

We perceive the importance of this observation, since the defect is proved to be in a cerebral nerve, and therefore to imply an affection of the brain, and to threaten apoplexy. It stands contrasted with that inability of closing the eye which results from the affection of another nerve and of a different system, the system of respiratory nerves, which are more subject to derangement than the cerebral nerves, and which offer a less alarming symptom.

It is said by surgical writers, that where there is *ptosis*, the patient, seeing a little under the eyelid, soon gets into the habit of squinting. Squinting is never a *habit*, the fact being, that the weakness of the

*levator* arises from a defect of the nerve common to that muscle, and to all the voluntary muscles of the eye; and hence the involuntary muscles acquire a preponderance, or comparative increase of power, and drag the eyeball.

Practice or experience points out a distinction betwixt the condition of the patient, when the eyelid has fallen from paralysis, and when it is spasmodically twitched by the action of the orbicularis. This last is the periodical ptosis; and do we not perceive that the one is the formidable affection of the cerebral nerve, and the other the sympathetic affection of the respiratory nerve?

The last Case was a paralysis of the voluntary muscles of the eye-ball: the following note, which I owe to our ingenious

House-Surgeon, Mr. Goss, refers to a tremulous motion in the involuntary muscles :—

### VII. *Incessant Motion of the Eye.*

“ Joseph Rogers, 35 years of age, has lost the right eye, and has had an opacity in the centre of the cornea of the left eye for 20 years. The left eye has a curious semirotatory and involuntary motion, which is constant. The rotatory motion is to the extent of about one-fourth the circumference of the ball. The cornea is nearer the nose than is natural, forming an imperfect squint. He has not the slightest power in arresting this motion ; it is that which would be produced by the alternate action of the obliqui antagonizing each other.”



I had put my young friends in the hospital upon investigating this case. But being a physician's patient, and they not knowing my wish, he was dismissed. When the pupils brought me to visit this man, they announced it as a case where, notwithstanding the continual motion of the eye, the patient was insensible to that motion, and yet saw objects naturally and at rest.

Was this a defect arising from the disorder of nerves, or an accommodated action to the opacity of the centre of the cornea?

Here the case of Martha Symmonds, p. 362. of the text, may be perused with advantage.

VIII. *Case of partial Paralysis.*

“ Mary Brown, æt. 15, a pale and emaciated girl, was in the physicians’ ward for an obstinate constipation of the bowels, and for some symptoms of paralysis.

“ We learn, that when four years old she fell and struck the back of her head. She was stunned by the blow, and remained insensible for a short time. She was for two days sleepy and lethargic, when it was observed that the left side of the body was completely paralysed. This paralysis continued for fifteen months, without any amendment taking place. After this period she improved slowly, and at the end of another twelvemonth she was so far recovered as to be able to walk. The disease then remained stationary, and no alteration

appears to have taken place up to the present time.

“ She is in a very feeble condition : the paralysis seems now to be confined to the left side of the face, with the exception, however, of the left arm, which is much weaker than the right. There is not only a want of power in the muscles of the left arm, but the sensibility of the extremity is evidently impaired, for she is unable to perform those actions which require the combination of the delicate sense of touch, and the finely-regulated action of the muscles. She cannot pick up a pin.

“ The sensibility of the left side of the face is but little affected. The parts supplied by the portio dura on this side have lost all their motion ; the mouth and right ala of the nose are dragged towards the right

side. She is unable to move the left side of her face, even in the slightest degree. When she smiles, this side is void of all expression, and is in strong contrast with the opposite side. She says that the food is apt to lodge on this side of the mouth, betwixt the cheek and the gums. The inability to close this eyelid affords us a good opportunity for observing the motion of the eyeball in the act of winking. Every time that she winks, the uncovered eyeball of the left side is turned up, and as quickly descends again. This motion of the eyeball is performed with extreme velocity, but at the same time is so obvious and demonstrable, that the most careless observer could not overlook it. In order to see the same motion of the eyeball performed more slowly, she was desired to attempt to close her eyelids; when it was observed that the eyeball was turned up in



the same manner, and remained so until she again unclosed the eyelid of the right side. The senses of taste and hearing on this side are impaired; the sight is dim, but she sees the whole of an object. The tendency to constipation of the bowels was coeval with the paralysis, and, no doubt, depended upon it." From the House-Surgeon's Case-Book.

This is one of the cases where the brain has been so influenced as to affect the whole nerves, both of sensation and of volition, of one side. As to the fact of the rolling of the eye, it is conclusive.

The following note was drawn out by one of my pupils:—

IX. " During the last course of lectures in Windmill Street, and just at the time Mr.

Bell was giving his lectures on the nervous system, a gentleman, who had been a pupil of another school of anatomy, came to consult him on his own case. His face was twisted to one side ; the muscles of one side of the face were completely paralysed, whilst he retained the sensibility of both sides of his face.

“ He presented to us the exact case, which we had heard described at lecture to be an instance of affection of the *portio dura* of the seventh pair of nerves. We observed the eyeball of the side affected : when he winked, the eyeball revolved upwards and inwards, and there was no doubt or difficulty in observing this movement, on account of the eyelids remaining wide open at the time when the eyelids of the other side contracted.

“ He ascribed the origin of this affection of the muscles of the face to having imprudently sat without his coat reading at an open window, after being fatigued and heated with a long ride. The partial paralysis of the face, and a stiffness of the neck, attacked him nearly at the same time.

“ We (the students present) showed him the dissection of the nerves of the face, which had been prepared for lecture. He examined them with interest, and the explanation of his case was apparently quite new to him.”

I have lost the other notes on this case.

If the reader will turn to authors upon the diseases of the eye, under the head of *Lagophthalmia*, or *Oculus leporinus*, he will

see how much practitioners are mistaken in their practice in applying the remedies to the eyelids in this disease, when the cause may be in the temporal bone, or the glands near the angle of the jaw, or some remote nervous irritation. Oculists, as Richter, for example, when the eyelids do not close, recommend rubbing the eyelids once or twice a-day with a drop or two of fennel oil, frictions upon the eyelids with the tinctura cantharides, blisters near or immediately upon the eyelids, the application of cold water to the eye by means of compresses wet very often in the course of the day, &c.

*Case of Paralysis of the Face.*

X. “ January 2. 1827, Daniel Stalder accompanied his wife, who had a paralytic



stroke, to the Middlesex Hospital. It was observed that the left side of his face was much distorted, and there was great wasting of the muscles. He was examined by Mr. Bell, before the pupils of the Hospital, and it proved to be a case of paralysis of the portio dura. The two sides of his forehead presented a very striking contrast: the right side was furrowed with deep wrinkles, which were more strongly marked when he frowned: a large fold of the skin was prolonged down upon the same side of his nose, which marked the descending slip of the occipito frontalis muscle; the left side of his forehead was perfectly smooth, the skin appearing to be stretched tightly over the bone, and there was no motion of the integuments in the act of knitting or elevating his eyebrows. His eyelids were quite motionless. When he was desired to wink, this eye remained open, and the

cornea was elevated so as to be quite hid under the upper eyelid. This eye appeared a little duller than the other, yet he says he never had any disease in it. He cannot see so clearly with it as with the other eye. The left nostril is collapsed, and has not that fulness which the right possesses. Some power of acting with his cheeks seems to remain, as in whistling there is a slight quivering observed. Although his lips are dragged to the right side, yet they do not appear to be totally deprived of muscular power: he can grasp pretty firmly the point of the little finger, when it is introduced into the left angle of his mouth. The muscles of the neck are perfect: the fibres of the platysma myoides start out when he puts it into action. The skin is naturally sensible. He states that he has had this affection since he was a

child. He has had no deafness ; nor any disease which he can remember to have preceded this distortion of his countenance.”

I have introduced this case, because the patient is at this time about the Middlesex Hospital, and can be seen as affording an instance of the effect of early paralysis in the seventh nerve.

On one point the following case is unsatisfactory, and, therefore, I am bound to give it : —

XI. “ I take the liberty to transmit to you this case, as it is curious, and bears strongly on the physiological doctrines taught by Mr. Charles Bell. If you are acquainted with him, or could obtain his opinion on it,

I should feel much gratified; and greatly obliged to you.

“ I am, Sir,

“ Your obedient servant,

“ J. WEBSTER.

“ Ramsgate, 22d August.”

“ *Partial Paralysis.*..

“ A healthy male child, four months old, of a plethoric habit, was very restless during the night of the 11th of August; a dose of calomel and scammony had been given him the day before, and the mother supposed the restlessness was owing to this circumstance. She observed, however, that when he cried, his face was drawn forcibly to the left side. — 12th. The aperient was repeated.—13th. On a careful examination there is nothing remarkable behind the ear



or about the angle of the jaw, and the child allows the parts to be handled without shrinking. There is an evident puffiness above and below the zygoma. With the exception of the eye, the features on this side of the face of this lively laughing little fellow are quite without expression. When he laughs, the muscles of expression on the left side are thrown into considerable action, and when he cries, (from the loss of all antagonising power,) into the most disagreeable distortion, the right eye remaining wide open; the orbicularis palpebrarum, the corrugator supercilii, as well as the rest of the muscles on this side, remaining quite relaxed. The nose is drawn to the opposite side."

The communication describes the remedies and their effects, and then proceeds:

“ When he is made to wink, the left eyelid moves with rapidity, whilst the right is quite stationary. The *occipito frontalis* partakes also of paralysis ; for when the child looks earnestly at any object, the eyebrow and skin of the forehead on the left side are drawn upwards, but on the right there is no corresponding motion. During sleep, the affected eye is only partly closed. The sense of feeling is alike on both sides of the face.”

In writing to Mr. Webster, I requested to know the condition of the eyeball ; the answer was not satisfactory.

“ October 6. 1826.

“ The right side continues relaxed and flabby, so as to give to the cheek the appearance of being larger than the other. The upper lip, on the affected side, over-

hangs the lower. If the child's attention is fixed, and the hands are suddenly clapped together before the face, the left eyelids move rapidly, and the right upper eyelid in part falls and recedes with a trembling motion, but the eyeball is not moved. When the child sleeps, the aperture formed by the want of approximation of the lower eyelid to the upper, crosses about the middle of the cornea; so that the direction of the eyeball is that of a person looking downwards. On raising the eyelid with the finger, so as not to disturb the child, and holding a strong light suddenly before him, the eyeball is pulled downwards and outwards."

The letter concludes with an apology for not answering my letter sooner, "owing to the almost constant habit of the child nestling his face in the pillow, as it were to avoid

the annoyance from light which the open eye is exposed to."

This is the only instance in which observation is at variance with my statement, that the eyeball revolves when the eye is threatened.

XII. Whilst these sheets were in the press, I received from Mr. Perry, of Great James Street, a note, giving me the account of a child who fell from a swing. He was stunned, and bled from the right ear, and was deaf in that ear. Three weeks after, the child became paralytic on the right side of the face, with great distortion of the features. After a judicious antiphlogistic treatment, without effect, the paralysis disappeared under the influence of mercury.



This is not a solitary instance of paralysis of the face from injury of the temporal bone. (See text, page 161.) It will be readily admitted, that whilst it was believed that the five branches of the fifth pair of nerves, distributed to the face, were muscular nerves or nerves of voluntary motion, such a distortion as this could not have been attributed to its real cause, the injury of the *portio dura* in its course through the bone, but, on the contrary, to the injury of the brain itself. This case, therefore, affords another proof of the practical benefit to be derived from knowing the distinction in the functions of the fifth and the seventh nerves.

*Disease of the Face.* ELIZA SMITH.

XIII. The following is one of the cases which is demonstrative of the distinct functions of the seventh and fifth nerves.

“ The disease from which this woman suffers has been supposed to be that sometimes called *Noli me tangere*, and in its more aggravated form, *Lupus*. The nose was destroyed by a slow process of ulceration, which opened the cavities of the face, so that we could look into the œthmoid and sphenoid cells. At this stage an ointment was used which had the happiest effect wherever it could be applied, and she appeared nearly well. But a small speck of ulceration remained upon the os planum, deep in the cavity: it could not be arrested. The disease in that way got into the orbit.

“ The eyeball became now protruded from the socket, with tension of the eyeball and tumefaction of the conjunctiva, attended with excruciating pain. At length the eyelids became so much pushed out,

that the eyelids could not meet ; the cornea was continually exposed, and became opaque.” (And now the symptoms began to bear on our present subject.) “ The sensibility of the surface of the eye, though in a state of ulceration, was lost. She could press her finger upon the eye. The forehead of the same side, the lip, and the cheek, and side of the nose, were deprived of sensibility ; at this time she could move the eyelids, although she could not close them from the bulk of the eye, and she had the motion of the cheek and lips.

“ When the eye and temple were perfectly insensible, and when, as she herself said, she could pick off the scales from the surface of the eye without feeling at all, she was tortured with most excruciating pain seated in these very parts ; that is to say, referred to these parts.”

But on the 28th December there is a note of this patient's case, which describes the swelling to have extended to the temple, the eye to have fallen, and where there was insensibility before, she cannot now bear the touch of a soft sponge.

“ She for some time previous to this complained of a drumming and a weary pain in her right ear ; and now she cannot knit her brows, or move the eyelid, and when she speaks or blows there is a stillness in all that side of the face.”

This case requires little comment. The swelling of the parts within the orbit, compressing the fifth nerve, caused insensibility of the part of the face to which these branches were distributed without affecting the motion.



When the tension and swelling subsided, there was returning sensibility; but more than this, the inflammation affecting the nerves in their passage through the orbit, gave the sensation of excruciating pain, perceived as if in the face. An inflammation of a nerve does not give perception of pain in the proper seat of the disease, but in the part to which the extremity of the nerve is distributed.

Whilst the sensibility of the face was recovering (by the diminution of pressure on the nerves in the orbit), the motion of the features was arrested. But previous to this the ear became affected, by which it is implied that the seventh nerve had become compressed, or engaged in the progress of the swelling.

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In addition to these communications on the nerves of the face, I shall give here the outline of one or two cases from foreign authors.

XIV. “ A phthisical patient \* had a suppurating tumour on the parotid gland, which exposed the mastoid portion of the digastric muscle. Paralysis of the face came on gradually, and at length the following symptoms presented.

“ The eyeball was perfectly under the control of its muscles. The upper eyelid could be moved. The lower eyelid was relaxed and everted. The eye was constantly weeping.

\* See Descot sur les Affections Locales des Nerfs, p. 318. 1825. — M. Descot published before the translation of these papers into French by M. Genest.

“ The nose was dragged to the left side ; the nostril of this side remained narrow, while that of the other was dilated by the action of its muscles. The mouth was dragged to the left side. The tongue was perfectly free in its movements.

“ When she laughed or spoke, the expression was most strange. On the right side, her face was as that of a dead person, while the left was highly excited. In speaking, we could see the buccinator puffed out and relaxed alternately, like the leather of a pair of bellows.

“ Whilst sleeping, the upper eyelid covered the pupil, while the lower eyelid was depressed and everted. Some hairs on her upper lip were pulled, which awoke her, and made her complain of being teased.

“At her death, respiration was convulsive. The eyeballs rolled in their sockets : the muscles of the left side of her face contracted with force, while those of the right side remained still ; and the mouth and nostrils, being convulsively pulled towards the left side, a frightful expression of countenance was produced.”

There is a minute account of the dissection given ; but it is sufficient to say, that a portion of the seventh nerve, corresponding with the breadth of the ulcer, was destroyed ; the two ends of the nerve which were thus separated, appeared as if teased out.

M. Descot, perfectly candid as to the source from which he takes these views, leaves me under obligation to him.



He remarks, that it is inexplicable how she continued to possess the motion of the upper eyelid. I would offer this observation. M. Descot having seen two extremities of the divided nerve, it must have been a branch or portion only which was here destroyed. For if the nerve had been destroyed as it makes its exit from the stylo-mastoid foramen, its course before it splits being very short, he might have seen one extremity coming out from the bone: but, he could not have seen the corresponding end of the nerve, but must have detected many branches. No doubt, therefore, the superior division of the *pes anserinus* had escaped the effect of the inflammation and ulceration. The branches of the portio dura which go along the temple to the upper eyelid, had remained entire: hence the action of the upper eyelid

was perfect, whilst the lower eyelid, and all the rest of the face, were paralysed. I have stated, that, from an abscess before the ear, I have seen the eyebrow fixed, while all the rest of the face continued in possession of its natural motions, — no doubt, because the superior branches only of the diverging nerve were engaged in the disease.

In the same author there is an instance given of destruction of the portio dura, by suppuration in the temporal bone, attended with paralysis of the face, and difficulty of swallowing. The same took place in the Case referred to at p. 8. under Dr. Gregory's care. See the System of Anatomy, p. 527. vol. ii.

XV. I select the following quotation from Beclard's notes upon the partial Paralysis of the Face. In these he makes reference to

my discoveries, as explained by Mr. Shaw in his paper in the *Med. Chir. Trans.* 1822. “ Il y a quelque mois qu’en enlevant une tumeur carcinomateuse de la région parotidienne droite d’une femme, le tronc du nerf facial fut excisé. Le côté droit de la face est resté paralysé ; mais la paralysie ne devint apparente que dans les mouvemens de la respiration et de la parole : dans tout autre cas elle est à peine apercevable.” Descot sur les Affections Locales des Nerfs, p. 313. I would just observe upon this, that many years ago I saw my brother perform this operation with similar effects ; and if the branches of the fifth pair were repeatedly cut for the tic douloureux, and the portio dura tied, without a conception arising in the operator’s mind of the functions of these nerves, it brings us forcibly to the conclusion, that it is through the knowledge of the anatomy, and not by what



is termed experience, that we are to obtain correct notions of the functions of parts, and more especially of the nerves.

“ DEAR SIR,

XVI. “ The case to which I alluded in my lecture this morning, as illustrative of your views, was that of a young lady from Scotland, who had a tumour deep seated behind the angle of the jaw. It was partially, and but partially removed by an eminent surgeon in this town. In performing the operation, the respiratory nerve of the face appears to have been divided, the mouth being drawn to the opposite side to a much greater extent than is common in hemiplegia connected with apoplexy ; the ala of the nostril and the whole side of the face participating in the paralytic affection. But the most distressing part of the evil consists in the loss of power over the eye-



lids, in consequence of which they cannot be brought together, so that the eye is never properly covered. The tears escape upon the cheek, and there are frequently slight attacks of ophthalmia; or perhaps it would be more correct to say, that some degree of inflammation is always present. The circumstance occurred several years ago, and no improvement whatever has taken place.

“ Respectfully and very truly yours,

“ R. MACLEOD.

“ January 17th.”

### XVII. *Case of Paralysis of the Face,*

In M. le Professeur Roux, of Paris; communicated by himself to M. Descot.

“ I have for many years been subject to rheumatism, which has most commonly been seated in the loins. In the month of

October, 1821, I was attacked with paralysis of the right side of my face. I am not aware of having been exposed to any influence which was likely to excite rheumatic disposition in the muscles or nerves of the face ; but it appears from the circumstance of the muscles being paralysed that some irritation has existed, probably a rheumatic irritation of the facial nerve. When the paralysis was complete, I began to feel pain in the temple, and there was œdematous swelling in the part. During the course of this complaint I have experienced two circumstances which may lead to the detection of the facial nerve becoming affected. 1. The membrane of the tympanum was painfully sensible even to slight noises. 2. The sense of taste was affected in the right side of the tongue, so that every thing tasted metallic. This last symptom has even been a precursor of the

complaint, being observed twenty-four hours before the occurrence of paralysis. In other respects, little pain was experienced, even in the trunk or the branches of the facial nerve. There has been no diminution of the sensibility in the skin of the face. The paralysis of the occipito frontalis muscle, of the orbicularis palpebrarum, and of all the muscles of the lips, on the right side, was complete. I have been like a patient who has hemiplegia, pronouncing words imperfectly, unable to blow with my mouth, laughing only on one side, feeling an inconvenience in eating, from want of action in the buccinator, deprived of the power to close my eyelids, &c."

This complaint ceased gradually as it began, yet rather more slowly.



This is the sort of case which is apt to throw the pathologist into difficulty, and therefore we shall give it some consideration.

I have stated why the respiratory nerve of the face, and the sensitive nerve of the face, take different routes to their destination; but it is not to be supposed that the sensibilities and motions of the face are in any degree more independent of each other than those of the arm, or any other part of the body. Accordingly, irritation and pain produce in the face what irritation and pain may do in any other part of the body. I would only suggest to the observer, that he should distinguish those motions which are expressive of pain from those which are spasmodic and incontrollable.\* This will

\* We find *trismus* and *tic* as a title; diseases quite distinct classed together.



be especially necessary in studying the disease called *tic douloureux*.

XVIII. The symptoms of the following case, in which I was consulted, are by no means uncommon. A gentleman returning from hunting was thrown; he lacerated his scalp, and suffered concussion. He lost a great quantity of blood, was reduced very low, and remained subject to an affection of his head, which after years has returned at intervals. It will come on in consequence of the conversation, heat, and light of a dinner party, even although he does not exceed; and on other occasions any direct disturbance of the stomach will produce it. He has head-ache and pain along the course of the nerves on one side of the head, a tenderness and indescribable sensation on the scalp, a puffing of all that side of the face, and swelling of the eyelids of the

same side. This after a day or two, by rest and evacuations, subsides. Still he becomes liable to it on any excitement of the mind, or derangement of the digestive organs.

Such attacks, as I have said, are not unfrequent ; and it is only when the puffiness and sensibility affect the seventh nerve that the paralytic affection comes on. Morbid sensibility and tumefaction result from the affection of the fifth, and form the primary class of symptoms. The seventh nerve partaking of the influence, palsy of the corresponding muscles is thus in a secondary way produced ; while, by an indiscriminating observer, the pain and the paralysis are attributed to the affection of the same nerve.

*Short Abstract of a Case of Disease of the  
Fifth Nerve.*

(From Descot, p. 316.)

It appears that MM. Serres, Majendie, Lisfranc, and Georget were present at the dissection of this case, and that the following circumstances were stated previous to the operation. The patient had been epileptic; for six months there had been inflammation of the eye, coarctation of the pupil, and opacity of the cornea; the conjunctiva was insensible to a feather; the nostril of the same side was insensible; sulphat of quinine was not tasted on the side of the tongue; the gums were spongy, dark-coloured, and detached from the bone; the hearing was very dull on the right side; the patient could chew perfectly well.



On dissection the fifth nerve of the side affected was remarkably altered. At its origin it was found soft, yellowish, and reduced almost to a jelly; and this derangement could be traced two lines into the tuber annulare. The nerve, traced forwards, exhibited the same soft, yellowish appearance, excepting the muscular portion, which was natural. The diseased nerve was a line and a half less in diameter than that of the sound side.

I must remind the reader, that, at the time of this dissection, M. Majendie had proclaimed a discovery, which threw my observations into the shade. I had proved that the sensibility of the head and face resulted from the fifth pair; but he asserted that vision, smelling, and hearing, were bestowed through the operation of the fifth pair; and the above dissection was



declared to confirm the truth of his discovery.\*

Had this assertion been correct, it would have been a severe blow to the students of anatomy. They trace the optic nerve into the eye, the olfactory nerve to the membrane of the nose, and the auditory nerve to the cavities of the ear. But what availed all this, if the French physiologist had proved, instead of the first, second, and seventh nerves, that the fifth was the nerve of smelling, seeing, and hearing?

But, as I have explained in the text, the fifth nerve bestowing sensibility, and that sensibility being the safe-guard upon the

\* “ Cette coincidence d’une lesion du nerf trijumeau, avec l’altération de l’œil et des gencives, la perte de l’action des sens, est d’autant plus curieux qu’elle confirme les résultats obtenus par M. Majendie par la section des nerfs de la cinquième paire.”

organs, we cannot be surprised that those organs should, in the absence of their natural guardian, be irritated and inflamed, and consequently deranged by the disease of the fifth nerve. See p. 268.

This is especially true of the eye. I have taken great pains to explain the apparatus by which it is protected, and the sensibility which excites that apparatus into operation ; but when the sensibility is withdrawn, the apparatus is useless, and the eye inflamed by irritation.

I have noticed in the text the difference betwixt the sensibility of the interior membranes of the nose and the power of smelling ; the one depending upon the fifth, and the other upon the first nerve. I have also shown that the common sensibility of the nostril was that which excited to sneezing

and blowing the nose, and that these actions were to the nostrils what winking is to the eye, the means of removing whatever is irritating or offensive.

But I need make no further observations upon this case ; it will be understood, in all its bearings, upon perusal of the preceding papers.

#### AFFECTION OF THE MUSCLES OF THE JAW.

XIX. I have, in my first and fourth papers delivered to the Royal Society, noticed, that the muscles of the jaw are supplied by the fifth pair, a cerebral and voluntary nerve, whilst the muscles of the face, properly, are moved by the *portio dura*, a respiratory nerve. The affections of the latter are very common, of the former more

rare, unless in disease of the brain, or in the instance of tetanus.

A gentleman brought his daughter to me: the account he gave would have induced me to believe the case an aneurism rather than an affection of the nerve, there was so much talk of swelling and pulsation. I gave the following *opinion*. There are, in this lady's case, two distinct subjects of consideration. The swellings to which the side of the head is subject arise from occasional violent spasmodic states of the muscles of the jaw on the left side; the masseter is, from time to time, brought powerfully into action, so as to present to the touch a round hard ball. The temporal muscle, which lies on the side of the head, is subject to alternate actions and relaxations which resemble pulsations.



The second point must be separated. The upper and lower jaws on the left side are deficient in growth. The cause of this defect of growth is very obscure, and the influence, of whatever nature, must have struck and had its effect nine years ago, in childhood. It is beyond control.

The first object will be to remove the local mischief in the sensibility of the gums; and the second indication is to remove, if possible, any source of irritation that may be in the uterine or digestive organs.

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The following Cases are in illustration of the second paper, where it is shown that the nerves of the trunk, neck, and throat are divisible into two distinct systems: the one the symmetrical system of nerves common to all creatures, for bestowing the

offices of sensation and voluntary motion, whose centre, therefore, is in the sensorium. There is a second class of superadded nerves, called the respiratory system : these are nerves which can perform their principal functions independent of the brain, and consequently of volition ; for although they be dependent for some of their functions on the efforts of the will, their principal actions may proceed during sleep, or when, from any other cause, there is an entire loss of sense and voluntary motion.

The nerves of this last class are more easily excited in dying animals : they, in fact, retain life the longest, since they continue to influence the actions of respiration when sensation and volition have ceased. Thus forming a class of themselves, they are excited by sympathies which do not reach to the other nerves, and are some-

times left entire in their functions, when the other class of nerves is peculiarly the seat of disturbance. The following Cases will exhibit them very subject to derangement ; and will, at the same time, show the necessity of disentangling them anatomically, in order to distinguish the symptoms of disease which belong to them.

The two classes of nerves of the body are similar to the two classes of nerves of the face ; but the intricacy of the former will make it longer before I have such an accumulation of evidence as I have thrown together in illustration of the nerves of the face. When practitioners shall have a distinct notion of the anatomy of these respiratory nerves, cases will accumulate.



AFFECTIONS OF THE TONGUE.

“ July 21. 1825.

“ SIR,

XX. “ I shall feel obliged by your answering to this letter at your earliest convenience ;

		*	*	*	*
*	*	*	*	*	*
*	*	*	*	*	*

“ In consequence of your important discoveries relative to the nerves, I am particularly desirous to have your opinion on the following case. The invalid is an unmarried lady, nearly seventy years of age, who has enjoyed uninterrupted good health up to the present illness. She has had occasional short attacks of gouty inflammation in both feet, and also in the knees, of very short duration. From the first of her complaining to the present moment, she



has been free from head-ache and from pain, numbness, or debility of the limbs. The vision and hearing are natural; the appetite good; the bowels regular, and the sleep natural. In short, there is not the slightest deviation from sound health, except in the particulars I shall relate.

“ Some few months ago she had some difficulty in using the tongue, and in expressing particular words. This difficulty has gradually increased, and now she can not protrude the tongue, or even move it. She has lost her speech altogether. The tongue itself looks soft and pulpy; but it retains its sense of taste and of feeling. The deglutition is impaired, and occasionally she is distressed with a sense of suffocation, in attempting to swallow food, which she is now obliged to do with great care. She cannot hack up any thing from the

throat, nor draw any thing from the posterior nares by a back draught. The features of the face are quite natural, and the skin retains its feeling. The saliva occasionally flows from the mouth, &c.

“ R. W. ROBINSON, M. D.

“ Preston.”

In p. 375. the offices of the three nerves of the tongue are slightly sketched out. This case is descriptive of a paralytic affection of the ninth nerve, a cerebral and motor nerve ; and therefore I conceive the symptoms more alarming, as proceeding from the brain, and threatening apoplexy.

When I have cut the ninth nerve in a dog, the motion of the tongue was lost, the power of feeding himself was lost, and it was necessary to destroy him. The power of deglutition however was entire, when

the morsel was put within the touch of the back part of the tongue, and the grasp of the fauces. The motion of the tongue to turn the morsel in the mouth was lost, and there was inability to place it in the fauces, but no other defect resulted. This seems to be exactly the condition of this lady. That she can swallow, is evident from her surviving the attack, which circumstance declares the glosso-pharyngeal nerve in activity ; and we are told, that she had the taste and the natural feeling of the tongue, that is, the function of the fifth nerve was entire.

I recommended in this case nauseating medicines, leeches under the mastoid processes, and a seton across the neck near the occiput, and any local appearance of gout to be encouraged.



I attended at the same time a young lady who could not swallow, and a boy who entirely lost his speech: I had the latter under my control, and can vouch for the accuracy of the detail. Suspicions often arise, that a trick is played off when these curious nervous attacks are witnessed. The anatomy of the nerves, and the study of their functions, should enable the physician to examine symptoms with accuracy, to distinguish the natural train of connections which cannot be imitated, and thus to banish suspicion.

*Case of Frederick Hill, æt. 10. Loss of  
Speech.*

XXI. " This boy cannot speak, and therefore is accompanied by his mother. She says from childhood he has been subject to a



pain in his ear. About twelve months ago, he was seized with an obstinate pain in his left ear, which gave him no rest, night or day. The pain extended to his head and face, and appeared sometimes to be in the bones of the forehead, and the sockets of his eyes. It then affected his teeth, and he had tooth-ache in every tooth in his upper jaw. After this his left eye became much affected, and he lost his sight.

“ From this attack he recovered, as she describes, by large bleedings, and injections into his ear, leeches behind the ear, shaving the head, and applying blisters. Twice he has heard something crack within his head, and these sensations have been followed by the discharge of matter from the ear, with relief. The discharge does not seem to have been trifling, for she says

it was at one time constant for some hours, and the fever and pain were so great, that he became delirious, and he was restrained with great difficulty by means of a strait-jacket.

“ I should have noticed, that, when at the worst, he was so irritable, that the slightest unexpected noise, even the striking of a clock, would bring on one of his fits. About five weeks ago, he began again to complain of pains in his ear, which increasing, brought on delirium before night. He was now unable to eat or move his jaws, or even speak, such motions producing a crackling pain in his ear. The day after this he was seized with a fit, in which it required two men to hold him for about half an hour, during which time he was insensible ; and when it left him, and his senses returned, he was speechless.

“ On 7th October he was admitted into the hospital. He had then a discharge from his ear, accompanied with pain in the temple, and was relieved by leeches and fomentations. About a week after his admission, he threw himself down in a violent fit of passion, as it would appear, and from this moment he was entirely deaf.

“ Another striking circumstance has arisen since that time. His left arm has become useless : it hangs by his side, and he cannot raise it. He can move his fingers, but not his arm ; and from the middle of the arm to a little below the elbow, it is acutely painful when touched.

“ He is now brought under Mr. Bell's care, who has made a particular examination of his condition. The actions of respiration are perfect. When he smiles, there is no



inequality in the action of the muscles of the face. He is reported to make noise enough in laughing. When cupped, he hollowed out, and they thought every moment he would speak, yet there was no articulate sound. The boy is acute, and understands every thing communicated to him by writing. When by this means he is asked to speak, and when the throat is grasped during the effort, there is not the slightest motion perceptible in the muscles of the tongue. Yet he can masticate and swallow with ease ; he can nearly touch the point of his nose with his tongue ; he can turn it down to the chin and sideways. When his surgeon's name is written, and he is asked to pronounce it, he remains fixed with his mouth open. When by signs he is told to close his lips in the manner necessary to pronounce the letters *b* and *p*, and when he is then asked to pro-



nounce these letters, there seems an utter inability. The consent of action between the chest, larynx, and mouth, seems to be lost.

“ This patient was repeatedly purged with calomel and jalap. He had leeches applied behind the ear, fomentations to the side of the head by means of steam, and blisters.

“ Nov. 22. This boy's condition is considerably improved. He tosses the arm which was affected over his head, smiling obviously in exultation. It is reported that he is now able to whistle ; and as this is an action in which the muscles of the chest and lips are associated, it appears to be a contradiction to a former statement ; but, on witnessing this attempt, we find that he makes a faint noise by drawing in his breath,

and that, in fact, he cannot whistle. He is asked if he can hear himself whistle, and he says no. Being urged to say how he knows when he is whistling, he takes the slate very readily to write, but finds a difficulty in expressing himself.

“ Nov. 24. A slight spasm observed on the lower lip.

“ January 7. About a fortnight ago, this boy, being distressed with the confinement of the hospital, made entreaties to be dismissed. He came to-day, with his mother, among the out-patients. She says he thinks it hard to be tormented when there is nothing the matter. He would do any thing to avoid blistering, and being promised that nothing should be done to him if he will make a noise and try to speak, his mother telling him to call the cat, he at-

tempts it very readily. His efforts confirm the former statement, that he is incapable of putting the tongue and larynx into co-operation in speech. The mouth is shut, the tongue and larynx perfectly still, and he makes a noise by impelling the air against the posterior nares. It is still necessary to communicate with him by writing.

“ Soho Square, July 5. The mother brought her boy to me this morning, and gave me the following account. The terror of the boy, and his extreme violence, prevented her following up my advice, but three mornings ago he recovered his hearing and his power of speech at the same time. She had just been observing that he could not be very ill, since he was tumbling about, and throwing his heels over his head in bed. Soon after his sister came running down stairs, saying that her



brother could speak, and a quantity of matter had come from his head into his mouth. From that moment he could hear, and with a painful degree of acuteness, the boy saying that the air rushed through his head. She describes his voice, too, as at first unnatural, and as if he spoke with difficulty ; a circumstance which cannot surprise us, when we recollect that it is nine months since he could speak a word. He has at present an extreme tenderness of the upper part of his head, and cannot bear to be touched there. The mother says the matter which came into his mouth was very offensive. A little matter comes from his ear. There is cotton in his ears, but it is for the purpose of dulling the sensation."

This case of Hill's is not demonstrative, for happily there was no dissection to ascertain the precise nature of the injury to the nerves ; but it is illustrative. There ap-



pears to have been an abscess, originally produced by disease of the temporal bone, and affecting the nerves of the base of the brain, first affecting the fifth nerve, and then spreading its influence to the seventh and ninth. If the disease had produced its influence mechanically and by pressure, there would have been no obscurity, and one side only would have been affected; but I imagine the inflammation had disturbed the operations of the nerves, without altogether destroying their influence, deranging, for instance, the fine associations necessary to speech, without arresting the action of the muscles of the tongue.\* It is remarkable, that the bursting out of matter, probably from the Eustachian tube, had such an instantaneous and simultaneous effect in restoring both hearing and speech.

\* See Dr. Abercrombie's cases in the *Edinburgh Medical and Surgical Journal*, July 1818.

The want of the power of swallowing, and the want of power of speaking, when occasioned by remote irritation, are not more extraordinary than the sounds which are produced from the same cause.

I have been consulted by a young lady of 15 years of age, who had a convulsive barking noise like a cough, excepting that the larynx was alone affected, and there was no conforming action in the pharynx, velum, and lips. She would sometimes cough naturally in the intervals of this noise, but this natural coughing did not interrupt the return of the unpleasant hard bark at the rate of ten times in a minute; it ceased when she was asleep, but the moment she was awake the family heard the noise, intolerable from repetition. It continued a month, and returned three successive winters.

I have seen an instance in a young woman, where the same cause produced a more permanent and alarming effect, a spasm in the glottis, so continued and so severe, that the attendants called upon me to perform laryngotomy.

All the subjects of these odd cases, which we do not understand, get well. This is consolatory to a patient, certainly, but not very satisfactory to ourselves. Ought it not to be a question, what nervous affections are consequent on trivial irritation? Without entering on the question, whether deranged health be followed by the imperfect and deranged action of the uterine system, or whether the latter be the primary disorder — the ovaria are the source of irritation; and the consequences are exhibited through the most susceptible system of nerves, the respir-



atory system. Hence the disorder of stomach, the spasms, globus, the difficulty of deglutition, the aphonia: hence the affection of the countenance, the tears, the sobbing, and spasms of the eyes and face, and throat, and chest, and stomach.

DISORDER OF THE RESPIRATORY NERVES OF  
THE TRUNK, RESEMBLING THOSE OF THE  
FACE.

XXII. Before I understood this subject sufficiently to be minute in my inquiries, I lost a fine opportunity of making observations. I visited a lady who lay on an inclined plane, totally deprived of the power of moving, but her breathing was easy, and her countenance and eyes agreeably vivacious, although she could not speak.\* Here was a

\* This lady by indistinct sounds in her throat, which were quite unintelligible to me, could make herself understood by her maid.



case of the *paraplegia* of the older authors — a palsy affecting the whole body below the neck.

But it is clear, that, in such a case, as the patient lives, so must she breathe; and if the case were duly considered, we require nothing more to convince us of the distinction of the classes of cerebral voluntary nerves and nerves of respiration.

Even the more common case of *hemiplegia*, or the defect of motion of one half the body longitudinally, affords us the opportunity of distinguishing the act of respiration from voluntary action. For although the patient cannot, by a direct effort of the will, move the muscles of the side of the neck, or of the shoulder, yet when he draws the breath, coughs, sneezes, or yawns, these

muscles are put in action.\* See p. 218. to p. 221.

The respiratory nerves thus happily left out of that influence of affection of the brain, which debilitates the voluntary actions, are subject to other and peculiar disturbance of their functions. In regard to the disturbed respiratory actions of the face, I fancy the preceding cases are satisfactory. Were the subject enough studied, I should be furnished with as many consultations on the nervous affections of the neck and chest.

[Read p. 253. to p. 262.]

\* The most ingenious men, as Boerhaave and Van Swieten, will, with all their knowledge and erudition, be defective in their account of such cases, from attending to the muscles without considering the sources of the muscular power. See the valuable works of Dr. Cooke, in the part Palsy, p. 36.

*Spasmodic Twitching of the Respiratory  
Muscles of one Side.*

The unpleasant spasmodic actions of the muscles of the face, noticed in the text, p. 254—256., &c. are continued, in some instances, upon the side of the neck and chest, through the influence of the same class of nerves. The following is an excerpt from a communication on this head.

XXIII. “ At every interval of three minutes or thereabout, there is a *sniffing* and twitching of the nostril of one side, the eyelids of the same side are at that moment spasmodically closed, and the angle of the mouth forcibly drawn towards the angle of the jaw ; the chin is tilted upwards and sideways, and there is a wriggle and a retraction of the shoulder. While there is an

audible sniffing caused by the contraction of one nostril, there appears to be a motion of the diaphragm, and of the muscles of the side of the chest; and this I judge of in part from the motion produced, but principally from the drawing of the breath, which causes a sound at the moment that the spasm of the face takes place.”

This is the description of a very frequent disorder. It interferes with no necessary action of the parts, for it ceases while the patient is actively engaged, as if the voluntary effort could stop the tendency to spasm in the respiratory system; it is, however, increased by agitation and speaking.



*A Spasmodic Affection of the Respiratory  
Nerves and Muscles.*

XXIV. “ Anne Roper, in June, 1825, was admitted into the physicians’ ward, having a spasmodic affection of the muscles of the face, neck, and chest, which has no perfect intermission. She ascribes her present condition to having had dysentery, followed by prolapsus ani, a short time ago, which occasioned great distress. She says she has never been well since. Her bowels, at present, are out of order, and the catamenia are irregular.

“ The condition of this woman is very peculiar : inspiration is performed with a sudden spasmodic action, in her common breathing : she is also affected at intervals with more violent spasms, and respiration

is then hurried. On the commencement of a paroxysm, she bends her body slightly forwards, and thus prepares herself for the attack : her nostrils are widely dilated, the angles of her mouth are dragged forcibly downwards, there is a constriction of the throat, the shoulders and chest rise convulsively, as when a person has cold water poured upon the head ; there is a deep and violent inspiration, attended with a sniffing of the nostrils, from the air being inhaled through them only, and not through the mouth. The fibres of the platysma myoides start into view, there is a quick rising and falling of the pomum Adami, the sternocleido mastoideus, and trapezius on both sides, act powerfully in fixing the head and elevating the shoulders.

“ The spasmodic action of these muscles exists to a considerable degree constantly,

yet it increases in paroxysms which last for a few minutes so severe that she is deprived of the power of speech, and seems to be almost suffocated. These paroxysms recur at irregular intervals. It was observed by the attendants, that when she was excited by walking about the ward or by replying to our questions, they returned more frequently.

“ She could move her head with perfect freedom when we requested her, but still the spasmodic action continued. She also raised either shoulder, or twisted her face to one side, when she was desired. This woman continued under the care of the physician for about a month, and was discharged cured.”

The history of these symptoms was drawn up by one of my dressers, Mr. Alexander

Shaw. The case was successfully treated by Dr. Southey.

*Case of disordered Action of the Muscles of the Neck.*

Nov. 18. 1826.

XXV. A gentleman came this morning to consult me on account of a painful and spasmodic condition of the muscles of the side of his neck.

About 12 months ago his mind was exceedingly harassed, and to this he attributes his present symptoms. His countenance betrays want of general health, his stomach and bowels have required attention. He has been consulting the usual fashionable round of medical gentlemen. He has taken 5 grains of the blue pill at night for some time. His complaint is a wry neck.



The position of his head is not constantly awry. He can turn it in all directions, but at times (and I think while conversing with me) his head is gradually and by little and little turned round, until his right ear comes near to the sternum, and the chin is pitched upwards, and to the left side. The sterno-mastoideus is of Herculean strength, and when you grasp it in its state of action, it is as large as the biceps of a powerful man.

The contractions extend to the muscles of the neck and shoulder, corresponding with the distribution of the *nervus accessorius*, or superior respiratory. (See page 201. and the adjoined Plate.) I made him strip, but could not observe that the serratus magnus was at all affected.\*

\* His pain was in the mastoid process behind the ear. But this was an indirect effect of the complaint, and proceeded from the violent action of the muscle.

In this case we have an affection of a respiratory nerve, distinct from the common voluntary nerve, and bearing an analogy with the more common instances, because more observable ones, of the affection of the *portio dura* on the face.

XXIV. *Spasmodic Action of the Sternocleido Mastoideus, producing a continual Motion of the Head.*

Anne Turrell, aged 19. Northumberland Ward. — This young woman received an injury of the chest. The blow was so severe as to break the bone of her stays, and was followed by spitting of blood. The treatment necessary for this complaint brought her very low. She describes herself at this time as oppressed with a heaviness and numbness of one side of her head and

face, and having the sensation of cold water poured down her neck. This continued until the commencement of this singular motion of the head, which is the most remarkable symptom in her complaint. Conceiving this condition to be an effect of weakness, she left the hospital into which she was first received. From that time, however, until she came into the Middlesex Hospital, the motion of the head has continued.

“ There is a perpetual rolling of her head night and day. It was first noticed whilst she was in bed, by a patient who lay near her. The head turns twenty-two times in the minute. The action producing this rolling motion is in the sterno-cleido mastoideus, trapezius, and splenius muscles, first of the one side and then of the other, so as to move the head on the tooth of the dentata

as regularly as if it were swung round by a pendulum ; and this continues night and day. Her breathing appears to be perfectly easy ; there is deafness in the right ear, and a degree of lassitude in the right side.”

This young woman continued an object of interest for some months, her complaint being principally referred to her stomach. She was at length seized with an attack of hæmorrhage from the lungs. She was repeatedly bled, and consequently reduced low, and became hysterical.

But what was remarkable, was the amendment of this motion in the head under the general debility. The motions became quicker, and the rotation to a less extent, like the diminished oscillation of the pendulum, from being shortened ; and when in bed asleep, the motion ceased. Another



attack of hæmoptysis succeeded ; but, notwithstanding, the affection of the muscles of her neck diminished. She was made an out-patient; and in a few days after I saw her visiting her old friends in the hospital, entirely free of the unnatural motion of the head which had so long distressed her, and in high spirits.

It has been observed, that in this case the spasmodic motion reached the muscles on the side of her neck, and that there was a weakness of one side. I am not, therefore, authorized to affirm, that the complaint was seated in the accessory nerve; nevertheless, it is my belief it was so, and that it is the susceptibility of this nerve which makes the sterno-cleido mastoideus muscle so frequently the seat of those deranged actions.

*Spasmodic Contortion of the Head and Neck.*

XXVII. Mary Preston, aged 19.—This young woman was brought from the physicians' ward unto mine, that I might have a more frequent opportunity of studying her case.

“ The sterno-cleido mastoideus, and the trapezius of the left side, are subject to almost continual actions, which twist her down to that side; the ear is brought near to the shoulder, the head turned round, and the chin pitched up, whilst the shoulder is elevated and the body bent. These violent actions are attended with considerable pain.

“ The actions of the muscles are not constant nor regular. The violent contractions come at intervals. The sterno-cleido mastoideus first comes into action,

drawing the head forwards and downwards ; then comes the trapezius, twisting the upper part of the trunk, and carrying the shoulder to the ear.

“ This has continued with longer or shorter intervals, about eighteen months. It began by slight degrees. She first perceived that she had a drawing of the head towards the shoulder, with little pain, and slight inconvenience. Previous to this attack she had been delivered, after a severe and protracted labour. She is now obliged to support her head with her hands, otherwise it is drawn completely down to the shoulder. She complains of pain in the head, which is attributed to the continual action of the two muscles.”

I am often obliged to cease conversing with her, and to draw off the pupils from

the ward, seeing that her anxiety increases the violence of the spasm. I ordered to this patient a soft-stuffed collar, to be put round the neck, on which I hoped the head might rest, and save her from the necessity of carrying her head, as it were, continually in her hands, which was a thing painful to witness. But no support or control by bandage could be borne.

When first brought into the surgeons' ward, she was found to have scarlatina; after this I thought I had got some indication, in her vomiting three *lumbrici*. After a course of worm medicine, she had an attack of continued fever; and it was necessary, in her debilitated state of health, to send her out of the hospital.\*

\* *Obstipitas lateralis*. Musculi sterno-mastoidei dextri strictura, Boerhaave, Consult. pag. 220. Tulp. lib. 4. cap. 57. Boneti. Mercur. Compil. pag. 130.



Is it too much to ascribe the affection of these muscles to their strain in the act of

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“ Syndicus Genevensis sexagenarius, vir rebus publicis diu intentus incidit in obstipitatem lateralem : caput ipsi, vellet nollet, dextrorsum vertebatur, sine inclinatione, adeoque ab oppositi lateris sterno-mastoideo musculo trahebatur fortius et ab antagonista debilius : in utro horum foret vitium roboris aucti vel imminuti, vix cognosci poterat, nec tensio alterutrius musculi id satis indicabat. Præscripta incassum multa remedia ut apud nos aquarum thermalium affusio, suaserat Boerhaave sequentia, 1°. de lapsum aquæ calidæ in nudum caput mane et vespere ad septem minutorum spatium quotidie per sex septimas cum frictionibus moderatis : post has embrochas : 2°. locum dextri musculi sterno-mastoidei mane et vespere inungendum diu unquento althææ composito : 3°. totam plagam sinistri seu antagonistæ eodem tempore fortiter confricandum pannis siccis, succini accenso fumi penetratis, ut ejus robur invalescens parum faceret equilibrio cum antagonista obtinendo.

“ *Obstipitas spasmodica.* Boneti. Lorry de Melanch. p. 115. [Læsionis artificialis sanitatis exemplum ad producendam integritatem ejusdem est in descissione artificiali musculi sani ut par sit læso, et contractio cesset. Quod è chirurgis et suadetur et fit.]

delivery? Nerves are over-exerted by violent actions, as much as muscles are over-strained. I have known the shoulder of a little girl fall quite down, in a temporary palsy of the muscles which support it; and in that case it was presumed to be owing to an over-strain. We are quite in the dark as to the particular nature of the disturbance in the nerve. Apparently from the same cause we see a class of muscles become suddenly paralytic, or subject to occasional twitchings, or to violent

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“ Parochus quinquaginaris, ab studio acriori, incidit in motus spasmodicos alternos et laterales capitis, quos reprimere vel suspendere vix poterat interdiu, caput in latus inclinatum manu sustinendo, sed noctu somno urgente compescebantur. Morbus per plures menses perseverabat cum præscripserim fomenta emollientia, occipiti applicanda, nam convellebantur muscoli, qui a parte colli postica ad caput tendunt: præscripsi etiam narcotica, juscule pulli, dein lac asininum, balnea domestica, cet. a quibus melius habuit.” — *Sauvages*.

and continual actions, by which they are inordinately increased in strength.

I think the reason of the obscurity in these cases will be apparent to the reader. It is not the muscle properly which is diseased, but the nerves: not all the nerves of the muscle, but only one class, which is the reason why the muscle is so strangely and spasmodically contracted, whilst it does not refuse the influence of the symmetrical voluntary nerves. The muscle being an engine moved by two distinct powers, and one of these only being deranged, is the reason of the difficulty in comprehending the case.

The practice advised in the foot note at the bottom of p. 116. is not to be thought of. The intelligent reader will perceive the connection betwixt this affection of the

accessory nerve and the disease of the sterno-cleido mastoideus, for which an operation is advised by modern surgeons; and that without these studies the diagnosis will be difficult.

*The Respiratory Nerves influence the Muscles of the Trunk when they are without voluntary Power.*

I have observed, that when the spinal marrow is cut through by a fracture of the spine, and the accessory nerves of respiration alone remain to animate the chest, the patient can yawn, but he cannot cough. Yawning is an act of the respiratory system, in which the muscles of inspiration are slowly brought into action.

The following communication from Dr. Abercrombie will throw additional light



on this subject ; and the intelligent reader need not be informed, how successfully this gentleman has cultivated the pathology of the brain.

The note is addressed to Mr. Shaw.

XXVIII. “ I think the following case will be interesting to you and Mr. Bell. I had some time ago under my care, a man affected with hemiplegia of the left side ; the palsy complete, without the least attempt at motion, except under the following circumstances : he was very much affected with yawning, and every time he yawned the paralytic arm was raised up, with a firm steady motion, until it was at right angles with his body, (as he lay in bed on his back,) the forearm a little bent inwards, so that his hand was above his forehead at its greatest elevation. The arm was raised

steadily during the inspiration, and when the expiration began, seemed to drop down by its own weight with considerable force. He continued liable to the affection for a considerable time, and it ceased gradually as he began to recover the natural motion of the limb.

“ Very sincerely yours,

“ JOHN ABERCROMBIE.

“ Édinburgh, 26th March.”

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XXIX. — ADDITIONAL OBSERVATIONS TO THE  
CASES OF INJURY OF THE SPINE, p. 221.

A patient, who had a deep ulcer in the back part of the throat, was seized with symptoms like those of apoplexy. These symptoms continued for two hours. At this time the patient's head fell suddenly forward, and he instantly expired. On dissection, it was found that the ulcer had destroyed the

transverse ligament, which holds the process of the dentata in its place. In consequence of the failure of this support, the process was thrown back, so as to compress the spinal marrow. The parts are preserved in my collection.

We have here another proof that when the medulla oblongata is crushed, the death is instantaneous ; and that the respiratory nerves, being those of expression, no contortion or mark of agony accompanies this sudden death. But there is another important feature here : the apoplectic symptoms preceded the crushing of the spinal marrow. If this disease had occurred lower in the spine, it would not have been different from the common case of paralysis of the lower extremities from disease of the vertebræ, where the communication of inflammation to the spinal marrow

or its theca, and not the mechanical pressure of the bones, occasions the defect of sensibility and motion.

XXX. A man was brought into the hospital, having had a severe injury of the head. Two attendants were doing their duty to him ; one was letting blood in the arm, whilst the other was shaving his head : the blood suddenly stopped, and the operator looking up, saw that the patient had ceased to breathe, and was without motion or expression of any kind. On dissection, it was found that the fracture had gone through the foramen magnum of the occipital bone, leaving a loose portion. This portion of the bone had been turned upon the spinal marrow, and crushed it.

I have had various examples of fractured spine, but none better calculated to illustrate



the function of the nerves of respiration than those described at p. 225. But the following case of diseased vertebræ is very instructive.

*Case of Palmer. — Effects of Disease of the Spine.*

XXXI. “ October 4. 1825. — James Palmer, æt. 16., was admitted into the house, under the notion that he was suffering from a blow upon the head. But, on enquiry, it is found that he received no violent injury, and that a man in good humour had struck him with his open hand on the top of the head. It is not possible that this could have hurt him, unless the disease we are presently to describe had made some progress.

“ The surgeon, on examining this patient

and hearing his story, directed his attention to the spine, and on feeling the nape of the neck, he desired that a minute account of his history should be made out.

“ The patient states, that about three months ago he caught a violent cold, attended with sore throat, and stiffness and swelling round the neck. When the general swelling subsided, there came on a swelling at the back of his neck, which continued to increase until he felt a numbness in parts of his arm and fingers, and likewise in the leg. He at length lost the use of the right arm and leg, and was brought here in the condition to be described.

“ There is a swelling round the spine on the back of the neck. It is a thickening of the ligaments and cellular membrane around the bones; the tumefaction is greatest on the

right side of the neck. He complains of no pain, and to a certain degree he can bend his neck. He requires assistance to move either the arm or leg of the right side. The left side is less affected. On the 8th of October an issue was made on each side of the cervical spines. They were made with a cut of the scalpel, and bled freely. Next visit he was sensibly better ; he could move his arm and leg. But on the following visit he was in the same state as when admitted.

“ It being supposed that so immediate and so short an influence could only be attributed to the loss of blood, eight leeches were applied round the issues, and ordered to be repeated.

“ 14th. Within the last few days he is worse. He complains of more numbness, and can neither move leg nor arm. He has

pain down the right side of his neck. When he attempts to move the head, he has great pain, and the pain is increased when the head is permitted to fall forwards. A stuffed collar is ordered to be applied so as to support the head in every position of the body, and to give rest to the inflamed vertebræ. The issues to be frequently touched, and kept active, and leeches to be applied round the issues. His bowels are attended to.

“ 18th. This boy breathes better, feels better, and turns his left hand more freely : and, as the pulse admits of it, the leeches are to be continued.

“ 19th. To-day he is certainly not better. He lies a little twisted ; his breathing is more laborious. He complains of the difficulty of breathing, and being asked to



say in what respect, he says it requires more effort in speaking, and he cannot continue it without increasing difficulty.

“ 20th. He is worse to-day. Upon being asked for his hand, which he supposed was lying across his breast, he was much surprised to find it lay by his side.

“ 25th. His breathing is difficult ; he complains of a sense of weight upon his chest ; his voice is much more feeble. He cannot call out ; and when he endeavours to do so, it is very feebly ; and he says it appears as though his voice came from his neck. On examining the muscles by which he breathes, we readily discover the sterno-cleido mastoideus in strong action. The abdominal muscles are totally inactive and loose.

“ 7th January. From the wasting of the abdominal muscles the motion of the intestines can be seen through them, and from their state of relaxation the hand can be pressed very deep under the scrobiculus cordis ; in doing which he is sensible of pressure against the stomach, although insensible on the integuments of the belly. When he attempts to cough, he raises his chest, but can give no impulse in discharging the air ; he expires by the falling of the chest merely.

“ Among other circumstances it deserves notice, that, when asleep, his thighs are involuntarily drawn up ; and of late his limbs are thus continually drawn up, and he has no power of pushing them down. About a week ago he was attacked with pain in his head, and had the sensation of

water trickling down into his ears ; since which he has been deaf.

“ Sept. 1. It is now some months since any note has been taken of this case, and the improvement is remarkable. The motion of the right arm first returned, and then the left. He then began to move his right leg, and then the left. At last he managed to get out of bed, and crawl about the ward: he is now, with the aid of crutches, able to walk to the water-closet. He complains of pain in his jaw on the left side.

“ In all this time, the treatment has consisted of attention to his torpid bowels, that no distressing accumulation might take place ; and care has been had to keep the issues in his neck active, and to preserve the vertebræ from being moved.

“ Mr. Bell, who is curious to observe the effect on his voice, makes him call the nurse, which he does now of himself whenever he sees his surgeon approaching on the visit. This is to show how much he improves. When this experiment was first made, he raised his sternum by evident exertion, and let it suddenly go down in pronouncing the word, nurse. Of late the power of enforcing the voice by the action of the muscles of expiration has been resumed.

“ 28th. He now walks about the ward, and has the use of both legs and arms ; but the right arm is the weakest.

“ He knows when the fingers of the right hand are touched ; but if you close them while his head is turned away, he is not aware of their position, unless the points of



the fingers touch the palm ; so that if you extend the fingers, he says they are bent. His speech is much improved, and all the functions of the body restored." — " Was made an out-patient."

This case of Palmer is very interesting, and abundantly confirms the result of the cases of fracture of the spine. By the progress of inflammation beginning in the vertebræ, and propagated to the spinal marrow, we see the function of the spinal marrow slowly debilitated, and at length the symptoms coming to resemble those produced by the crushing of the spinal marrow by the broken vertebræ. But here we can observe the gradual failure of strength, and the consequence of inactivity, in the wasting of the muscles. The most remarkable effect of this, was the possibility of seeing the intestines moving, and the relaxed ab-

dominal muscles partially rising and falling according to the distention and contraction of the intestinal canal. This state of the abdomen permitted us to examine the stomach, and to ascertain that its sensibility was entire; and it is fair to conclude, through the influence of the par vagum. The branches of this nerve to the stomach, like its subdivisions to the larynx and pharynx, are in possession of two functions ; the peculiar sensibility of the part is bestowed, and the arrangement of the muscles is formed, through its influence. It must be remembered, however, that this double office is from its receiving additional branches from the spinal nerves just as it is emerging from the base of the skull. From the first instance given in this section, where a lady was insensible below the neck, it may be presumed that the influence of the lungs, and heart, and stomach, on the respiratory

system of muscles, exciting to the act of breathing, was propagated through the par vagum.

As the symmetrical system of nerves to the trunk became impaired, the muscles supplied with the accessory respiratory nerves became more excited, and rose higher into action. At the same time, the voice became feeble. This is easily understood, for the strength of the voice results from the impetus with which the breath is expelled. In this case, the active muscular power of expelling the breath was lost, with the other voluntary powers of the trunk and extremities ; and by this we see the importance to life of these accessory nerves of respiration, for they continuing to possess power over the diaphragm, serratus magnus anticus, trapezius, and sterno-cleido mastoideus, they supplied a force of in-



spiration sufficient to preserve life, until amendment took place in the spinal marrow, and common spinal nerves. No one, I apprehend, will be bold enough to affirm, that if the muscles of the neck and trunk had been as entirely deprived of action as the abdominal muscles were in this case, the patient could have survived by the mere action of the diaphragm.

If the diaphragm were to act alone, it would pull down the margins of the chest; and in as far as the diaphragm tended, by its action and by its descent, to produce a vacuum, the ribs, by their yielding to the action of the diaphragm and their descent, would render the muscular effort nugatory; for inasmuch as the cavities of the thorax would be enlarged in their long diameter by the descent of the diaphragm, so much would they be diminished transversely by



the descent of the ribs and sternum. But when the serratus and mastoideus raise the thorax at the same moment with the contraction of the diaphragm, circumstances are materially altered. The ribs and sternum are raised against their elasticity, and consequently opposed to that state to which they would recoil even in death. The expansion of the margin of the chest increases the effect of the muscular effort of the diaphragm, the arch of that septum is contracted and bears down, and the abdominal viscera are lifted up, which, on the cessation of effort, recoil by gravitation into their position ; and thus the elasticity of the ribs, and the weight of the parts opposing the muscles of inspiration, preserve the life when the muscular power of expulsion is gone.

That accomplished physician, Dr. Cooke, conversant as he is with all authorities,

touches on that of Boerhaave. “ Boerhaave notices the fact, (of the organs of respiration and the action of the heart being entire in paraplegia,) and observes, in explanation of it, that the moving powers of the viscera can scarcely be said to arise from the nerves of the spinal marrow, but from the fifth, sixth, and eighth pair, and the recurrent nerves of Galen.” I hope it is not necessary to prove that these nerves are altogether insufficient for the purpose. This admission of the opinion of Boerhaave by an author whose work immediately preceded the publication of my papers, and by one so fully informed by study and experience, shows how long this department of our science has been stationary.

Let us study anatomy, not in opposition to authority, but as that sure guide which renders the perusal of authors safe, and, without which, theory takes place of facts.

In comparing the means possessed by the physician and surgeon, as contrasted with each other, for forming an opinion on a matter of this kind, I have sometimes persuaded myself that the surgeon has some advantages. The necessity, on his part, for the concentration of every power he possesses, natural or acquired, is an equivalent for the greater learning of the physician. Few can imagine what the surgeon experiences with the knife in his hand! I was suddenly called upon to perform the Cæsarian section on a woman in the ninth month of pregnancy. I found the woman in a state of suffering from which apparently she could not recover; and certainly nothing could be more like death than her appearance. She was speechless and insensible. But was death actually near? for this alone could vindicate the operation contemplated. Now, on the approach of death, the respiratory system is highly excited, while the



voluntary motions are subsiding. The chest rises high, the muscles of the neck are convulsively drawn, and the nostrils expanded. This is the *convulsio ab inanitione Hippocratis*. There was, in the present instance, no disturbance of the respiratory system, but, on the contrary, a grinding of the teeth could be distinguished—a tetanic symptom, therefore; and I waited until I had the satisfaction of seeing her revive, and of committing her to the care of the accoucheur, by whom she was delivered.

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And now, in parting with my reader, I congratulate him that we have a profession that furnishes us continually with new objects of interest, and makes us independent of all encouragement, whether from men of science purely, or from that part of

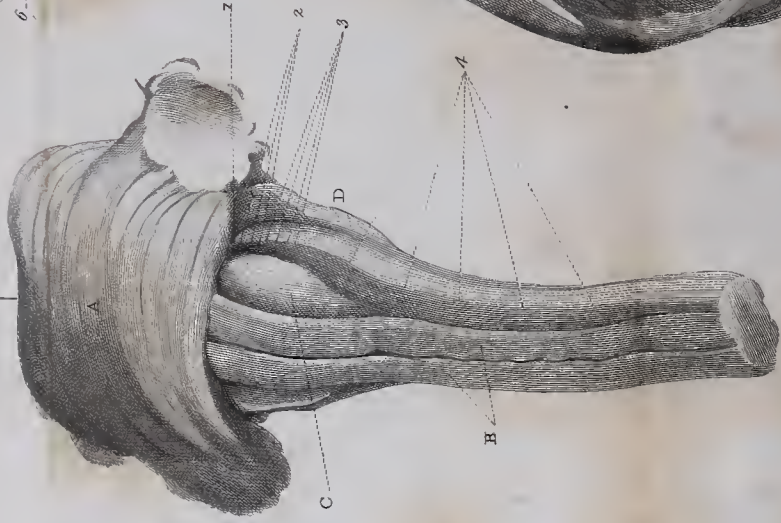


the public that follow science from fashion. They are occupied with matters which they conceive to be of superior consequence : we feel and know that we are engaged in pursuits, that are both higher as matters of science, and infinitely more important to humanity.





*Fig 1.*



*Fig 2.*





EXPLANATION  
OF  
THE PLATE.

FIG. 1. REPRESENTS THE MEDULLA SPINALIS.

A. The *pons Varolii*.

B. B. The anterior medullary columns of the spinal marrow, continued from the *corpora pyramidalia*.

C. *Corpus olivare*.

D. *Corpus restiforme*.

1. The origin of the respiratory nerve of the face.
2. Origin of the glosso-pharyngeal nerve.
3. Origin of the nerve of the par vagum.
4. Origin of the spinal accessory nerve, or superior respiratory nerve of the trunk.

FIG. 2. PLAN OF THE RESPIRATORY NERVES IN THEIR COURSE THROUGH THE BODY.

A. The *sterno-cleido mastoideus muscle*.

B. B. The *trapezius muscle*. It is seen to arise



from the back of the head, and from the spine ;  
it is inserted into

C. The scapula, and

D. The clavicle.

E. E. The *serratus magnus anticus*. It is left at its attachment to the ribs, but cut off from its insertion into the scapula, so as to expose the trapezius and the spinal accessory nerve.

F. The lower surface of the diaphragm.

G. The upper surface of the diaphragm.

H. The larynx.

The four great muscles (A. B.B. E.E. F. G.) are powerful muscles of inspiration.

To simplify this view, the regular or symmetrical system of nerves is not presented in this drawing, but only the respiratory nerves. It is the entwining of nerves of distinct systems which produces the apparent intricacy. If the spinal nerves were represented crossing these, and the network of the sympathetic superadded to them, we should have all the seeming confusion of the dissected body.

1. Respiratory nerve of the face, or portio dura of authors.

2. The glosso-pharyngeal nerve.

3. The superior respiratory nerve. It is seen to pass through the sterno-cleido mastoideus muscle, and to supply it with branches : then to take a course down the side of the neck, branching exclusively to the trapezius muscle.
4. The phrenic or diaphragmatic nerve. It is seen coming out from the spine, and running a direct course to the diaphragm.
5. The external respiratory nerve of the chest. It is like the last nerve in its origin, but it deviates in its course, passes on the outside of the chest to supply the powerful respiratory muscle, the serratus magnus E.E.

These three nerves with the par vagum combine the sterno-cleido mastoideus, the trapezius, the serratus magnus, and the diaphragm, with the lungs, the larynx, the tongue, and nostrils.

- 6, 7. The nerve of the par vagum. Coming from the same origin with the other respiratory nerves, it passes down to the internal organs ; but in its passage gives off these :
8. The superior laryngeal nerve, a branch of the last nerve.
9. The recurrent nerve ; a branch also of the nerve of the par vagum. Where the nerve

of the par vagum is in the thorax (7) at the same time that it sends off the recurrent (9), it sends off many small nerves to the heart and the lungs, and then descends in a plexus on the œsophagus, to the stomach.

THE END.

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